

HYDRAULIC MACHINE FOR ELECTRIC ENERGY PRODUCTION

[0001] This application is a U.S. national phase of International Application No. PCT/BR2003/000196 filed December 15, 2003, which designated the U.S. and claims priority to PI 0300098-2 filed January 14, 2003 and PI 0304573-0 filed October 22, 2003, the entire contents of each of which are hereby incorporated by reference.

FIELD OF THE INVENTION

[0002] This application discloses a machine specially developed for production of electric power through the movement of one or more cylinders, located in a tank or column of water.

SUMMARY OF THE INVENTION

[0003] Depending on the size of the machine, the cylinder(s) are embedded in one or more sleeves and the cylinders move upwards and downwards. Said sleeve and the cylinder are inside a tank or water column, and they perform their movements inside the tank or water column. In the sleeve there is a ring that seals the exit of the water (or other liquids) from the tank to outside. The ring also allows the transference of the liquid from the sleeve to a first tank. This ring, when leaned against the wall, allows the cylinder to be displaced from down to up, which generates an empty space in the interior of its sleeve where the cylinder once was. The empty space is immediately occupied by water (or another liquid) from a recovery box that recovers water used to move a rotor. A plug in the bottom of the recovery box controls the flow of water out of the recovery box.

Note that this box is higher than the level of the sleeve which ensures that the water in the recovery box will flow into the sleeve and cylinder, as a result of the difference of level.

[0004] Once the cylinder has been raised, the plug of the water box is closed, and the ring is opened. The cylinder makes the inverse course, going downward, and exerts the boosting of the water (or other liquids) through the opening of the ring. As a result, the liquid is transferred from the sleeve to a first tank. The liquid transference is fast and with little effort, as the cylinder is inside the first tank and occupies part of this space. The cylinder is moved upward and downward by a central axle that is moved by a motor that may be electrical or of other type. To this axle are tied two steel cables, which are wrapped around the axle in opposite directions. One of the cables holds the cylinder of the machine. The other cable holds a weight outside the machine. When the cylinder cable goes up the cable of the external weight goes down. When the external weight goes up the cylinder goes down. These movements are well balanced, which allows the cylinder to be moved with low energy consumption. The ring and the plug or valve can be actuated by pneumatic cylinders due to the need of speed in the production of great volume of liquid in movement. All these movements are duly commanded by sensors installed in several points of the machine.

BRIEF DESCRIPTION OF DRAWINGS

[0005] Figure 1 is a diagram showing a first embodiment of a hydraulic machine for generating electricity; and

[0006] Figure 2 is a diagram of a second embodiment of a hydraulic machine for generating electricity.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0007] In some embodiments, the machine may be of very big dimensions. The machine may include more than one cylinder, and thus multiple tanks. As shown in Figure 1, a pipe 2 conveys the water from the recovery box 3 to the column. When the cylinder 5 goes up, water immediately invades the space left by the cylinder. The recovery water box 3 receives a flow of water after it has passed the turbine rotor 27. When the sealing ring 6 leans against the cylinder sleeve 4, it eliminates the flowing of the water out of the interior of the tank to outside, and allows the recovery of the liquid that was used to power the turbine rotor back to the empty space left by the cylinder when it goes up. When the cylinder 5 goes up with the ring closed, it draws the water (or other liquids) in from the recovery box 3. When the cylinder 5 goes down with ring open, and the plug 10 closed, it discharges the liquid from the interior of the cylinder sleeve 4 to the interior of the mother-tank. This causes water to be discharged through the pipe 28 to the turbine rotor 27. The sealing ring of the cylinder sleeve is opened when the cylinder 5 is ready to start its descent. The sealing ring is closed when the cylinder 5 is ready to start its ascent. The pneumatic cylinders 7 and 8 have the function of opening and closing the sealing ring. The pneumatic cylinder 9 has the function of opening the plug or valve 10. The plug 10, when closed, prevents the passing of water or other liquids from the cylinder sleeve 4 back into the recovery box 3. The cylinder 4 also includes a left side cylinder guide-stem 11 and a right side cylinder guide-stem 12.

[0008] The external weight 13 balances the weight of the cylinder 5. The external weight 14 is attached to a steel cable that is wound around a pulley 14. When the cylinder 5 goes down, the weight 14 goes up. Another pulley 15 is fastened to the

central axle. An electric motor or some other type of motor spins the axle and imparts movements to the machine. In the embodiment shown in Figure 1, an electric motor is interconnected to the central axle 26 of the machine via a belt, and the motor 16 causes rotation of the central axis 26.

[0009] The machine also includes a motor supporting table 17, and a supporting table for the pneumatic cylinder 9 that moves the plug. Stems 19 and 20 attach the machine to the pipe. Multiple stems 21, 22 and 23 attach the machine to the ground.

[0010] A steel cable 25 is wound around a pulley 24 on the axle, and the cable is attached to the cylinder 5. The cables that are fastened to the pulleys move in inverse directions when the axle 26 is rotated. Water from the tank, which passes through the pipe 28, moves the turbine 27, and the movement is transferred to a generator. Thus, it is possible to produce electric energy.

[0011] An alternate embodiment of the machine is shown in Figure 2. In this embodiment, the element that moves up and down is constructed in form of an open topped cylindrical container. Liquid in the container is displaced by another cylinder 32 that remains stationary. Upward movement of the open topped cylindrical container 32 causes the liquid to be displaced. It should be emphasized that the pulleys 33 are fixed in the lateral sides of the cylinder.